

Meeting Minutes
Face to Face – Minneapolis, MN
Oct. 25, 26, 2016

Members

David Forfia, GWAC Chairman, Director,
Enterprise Architecture, Electric Reliability
Council of Texas

Ron Ambrosio, IBM Distinguished Eng. &
Chief Tech. Officer, IBM's Smarter Energy
Research

Ron Bernstein, President, RBCG, LLC

Paul De Martini, Managing Director,
Newport Consulting Group, LLC

Gerald R. Gray, Technical Exec., EPRI

Mark Knight, Chief Eng., PNNL

James Mater, Co-Founder & Director,
QualityLogic, Inc.

Farrrokh Rahimi, Sr. V.P. Open Access
Technology International Inc.

Carl Zichella, Director, Western
Transmission for NRDC

GWAC Associates

Gordon Matthews, Technology Innovation,
Bonneville Power Administration

Chris Villarreal, Director of Policy at
Minnesota Public Utilities

GWAC Member Emeritus

Ken Wacks, consultant to Sensus Metering
Systems Inc.

Members not present

Doug Houseman, VP, EnerNex, LLC

Stephen Knapp, Exec. Director, Power
Analytics Corp.

Heather Sanders So. California Edison

Thomas Sloan, Rep. State of Kansas

Associates not present

Jeff Morris, Rep. State of Washington, &
Principal Owner, Energy Horizon Corp.

Mark Paterson, Domain Leader- Grids &
Renewable Energy Integration CSIRO,
National Energy Flagship

Guests

Ed Barbour, Navigant

John Caldwell, Edison Elec Institute
Ed Cazalet

Julia Eagles, Public Policy, Xcel Energy

Paul Ehrlich, PNNL

George Hernandez, PNNL

Terry Hill

Ali Ipakchi, OATI

Andrew Nicholls, PNNL

Joseph Paladino, US DOE

Warren Wang, Navigant

Support – PNNL

Chris Irwin, US DOE

Ron Melton, PNNL

Susie McGuire, PNNL

Administrative

Welcome and Administrative Business

Mary Brown, Executive Vice President with OATI welcomed GWAC guests and provided a brief overview of OATI, now in its 21st year.

Ron Melton opened the meeting at 8:35 am.

It was noted that the GWAC F2F meeting for February, in the planning stages is expected to be held in San Diego. The dates have not yet been determined. Once these details are finalized an announcement will be sent out.

The Portland TES meeting will be held in Portland, June 13-15, 2017. The meeting will discuss the TE Roadmap, looking at what it will take in buildings and grid at scale. The next year's meeting will follow on to this theme with a look back at what progress has been made.

GWAC call for Candidates

Terms Expiring: Bernstein, Forfia, Gray, Knapp, Mater, Zichella. Mark Knight will need to be replaced since he is now a PNNL employee. Ron will put together a call for new members.

Section Committee: Paul De Martini, Farrokh Rahimi, Chris Irwin, Ron Melton and one outside party, yet to be determined is needed. Ron will ask Dave Wollman to join.

Steve Widergren gave an overview of the DOE GMLC Interoperability project now in year 1 of a 3 year effort.

- Chris Villarreal would like to be added to the communications for this effort.
- GWAC members would like to receive the Interoperability Requirements document

Mark Knight gave the committee a briefing about efforts to hold a future TES meeting at MIT. However for this year the arrangements cannot be made but possibly for 2018 or beyond it might be made. The main problem has to do with Finances. James Mater will contact SGNW regarding 2017.

Stephen Knapp noted that PJM has also proposed hosting TES 2018 in Valley Forge, PA.

Chris Irwin gave a review of the Transactive Energy Roadmap on Setting Expectations.

Buildings and Grid efforts are being funded by OE and BTO. Chris would like to be able to show DOE stakeholders how TE controls are a choice that emphasizes using the TE mechanism to optimize energy on the grid side while building commodities such as building comfort are also addressed.

Knowing where we want to end up is only one third of the goal.

He noted the need to articulate intermediate milestones such as hybrid mechanisms and stated that what is needed is a migration path as well as a vision path as Paul DeMartini has pointed out several times.

David Forfia provided a brief review of the past 5 Transactive energy Workshops, and resulting publications as well as related graphics.

He stated that TE has many domains and applications. If you start behind the meter on your premises you can connect directly to the Grid. The speed factor takes you to Control. Then the distribution grid and energy policy come into play. The first TE meeting was held at the OATI offices in Redwood Shores, California, followed by one at ERCOT, Texas.

The Grid is now moving into some new areas and scenarios. The story becomes increasingly complex as regulatory policies vary by state, region, and beyond. We next look at incentives. Fixed costs are costs that must be incurred by someone. As we start moving up to grid scale, it takes a long time to get through policies. Some things change faster than the grid can adapt. Overlaps between jurisdictions occur.

Looking at an implementable path is something we will do at the TE workshops.

Carl Zichella asked what elements have to be improved in the distribution system and what are the costs?

David Forfia noted that at last year's TES meeting David Owens told us that millions must be spent in Transmission and Distribution systems in the 3500 utilities that make up the grid. How do we make the cost of this fair to everyone and what are the benefits? The consumer will pay for most of these changes so will the costs be in line with benefits? Is there an economic value to consumers?

He did note an example that the NEST thermostat is appealing to even older consumers, both esthetically and for ease of use.

Ron noted that the drivers have changed that will enable an operator to think about needed changes or consumer behavior and distribution systems.

How will we recognize that things are changing?

Techniques and methods will come along to better implement these changes.

Ron Melton

Ron discussed the framing question – what will it take for deployment of transactive energy systems at scale in the electric power system, in end uses such as buildings controls, and in grid integration of distributed energy resources including building to grid integration?

Ron reviewed workshop problems for the breakout groups.

Paul DeMartini

DER Value and Impacts

New York, California and also Minnesota leading the country with their DER systems. They have been progressive in building new Grid infrastructure and we can look to their markets to see what physical investments have been made and how the markets are moving. Deferral and avoidance of incurring financials costs also themselves have a cost to the Utilities.

Ron Melton

Ron provided an overview of the Grid Architecture work being performed by PNNL as part of the GMLC.

Chris Villarreal

Regulatory Trends

Chris and his team have been involved in creating a manual on regulations which includes definitions of DER for their utility consortium. The document reviews various sources of energy, as well as Valuation. There is a maturation curve for DER, and how it looks at how to develop valuations for these. As a variety of energy resources come online, the documents is a guide on how to value these new resources for Grid distribution.

The document has five main themes such as a rate case looking out 5 to 10 years.

Minnesota doesn't have AMI. The manual discusses AMI, ADM and DERMS and how they might be appropriate for Minnesota.

In Minnesota, the average home is 40 years old. This is a factor that affects the state's ability to efficiently implement DER changes.

Adoption rates are being monitored by Minnesota, and this will influence the state utilities decision on how to proceed with Grid modernization.

The document is available on the Minnesota Utilities home page.

At yesterday's workshop distribution system planning for Minnesota was discussed.

The report talks about the vertical integration and wholesale markets of Minnesota.

Chris told us about the status of Rhode Island's utilities and how they are planning their future grid. They are looking for efficiency and least cost benefits.

Maryland also is implementing modernization techniques and have some proceedings that started in Sept. 2016 and will go on until 2018.

Minnesota does not have incentives for rooftop solar but they do have community solar gardens.

These programs are still relatively new, less than five years old. Each utility is still analyzing how to best implement distribution systems.

George Hernandez

Technology Trends

For efficiency and Demand Response, we need to create a system in which components will talk to each other. With end users the value isn't energy. It is what the energy creates – the emotion, the flow, and the uses for energy. So to engage end users we need to keep this in mind.

Volttron, an open source platform has been created at PNNL for use by third parties and in a multi-directional platform.

Transactional based products in an open source platform may stimulate new products that customers will like for energy efficiency and other benefits.

For connected buildings, security, integrated teams, service and data streams, and custom applications that address health, environment, safety and sustainability will be part of the solution.

George gave examples of very innovative new products that take advantage of tools already in today's market place. He apprised the group that there are already third party products coming on that can provide Grid services for less cost than the utilities could provide it for. Many may not need permits or electricians. He has found some interesting products on Kickstarter.

He said that where he lives in Texas, the power goes out quite frequently. So a product that switches his refrigerator quickly over to auxiliary power automatically in a power outage would be good for him and there is a third party product in development on KickStarter that will do this. He said he has seen some very creative products coming onto the market.

Breakout Session 1: Question 1

- What are the key drivers for grid and buildings transformations?
- For example,
 - Increased use of DER in distribution systems results in need for control and coordination of non-utility owned assets
 - Customer choice of supply source.
 - Increased system variability
 - Drive to reduce carbon footprint, etc.
 - Bulk distribution systems & capturing new energy resources
 - Need for a solid economic model
 - Climate and carbon tax
 - Changing dynamics
 - People sharing information and interacting with services
 - Value being reconsidered that is more easily identified

- **Breakout Session 2: Question 2**

- What are the enabling elements for grid transformation and the key transformations?
- For example,
 - Distributed control and coordination technology
 - Edge computing
 - Internet of Things growth, and so on.
 - Industrial internet of things
 - Resources that can be leveraged
 - Bring your own device, not yet tapped into
 - Change in end use consumer use of the Grid – partially off grid
 - Revenue potential from new technologies*
 - New ad hoc or grass roots dynamic drivers (bottom up)*
 - How to have a framework – a set of things to facilitate these*?
 - Time of use – rather than postage stamp* (real time)
 - Microgrids and how to manage reliability and security
 - Block Chain technology to manage account data
 - What is the definition of real time (seconds, milliseconds)?
 - Device centric models rather than service
 - Factors beyond economic such as societal issues, carbon centric
 - Resiliency – worst case scenarios in an inflexible environment